

### DETAILED ACTION

This Office Action is in response to the communication filed on 8/13/09.

Applicant's arguments have been considered, but are not persuasive. Claims 1, 3 and 5-20 are pending. Claims 13-20 are withdrawn. This Action is FINAL.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5-7 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Bregoli, US 4,548,876.

Bregoli teaches a fuel cell comprising a cathode 24, an anode 28, an electrolyte 26, a cathode collector 14 (interconnect), a separator plate 12 (current collector), an anode collector 30 (interconnect) and a separator plate 32 (current collector). See Figure 1. An oxidant gas is provided between the separator plate 12 and the cathode 24 (4:44-52). A fuel gas such as H<sub>2</sub> is provided between the separator plate 32 and the anode 28 (5:9-23). Catalyst particles 34 are provided on the anode collector 30 and may be comprised of the same materials used in the anode and cathode catalysts (5:45-58). Figure 1 shows a collector 30 having an offset plate fin configuration having first and second uncoated portions.

Note the limitation "capable of catalytic conversion..." only requires the fuel cell be structurally able to perform the function. The claim does not require catalytic

conversion of a hydrocarbon fuel. Catalyst particles 34 are "capable of catalytic conversion of a hydrocarbon fuel". Thus the claims anticipated.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3 and 5-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blanchet et al., 2002/0197518.

Blanchet teaches a corrugated current collector for direct internal reforming fuel cells. The corrugations in the rows are such the corresponding peak regions have a finite off-set (abstract). Figure 14 shows a fuel cell having a cathode 112, an anode 111, an electrolyte 113, a cathode current collector 92 and an anode current collector 91. The fuel cell also contains bipolar plates 93 (0060). As shown in the figures, Blanchet teaches the collector 91 has first and second uncoated portions. Catalyst elements 15 are positioned within the corrugated current collector used as the current collector on the anode side of a direct internal reforming fuel cell in which the catalyst elements 15 serve as the internal reforming catalyst (0041). In internally reforming fuel cells, a steam reforming catalyst is placed within the stack of fuel cells to allow direct use of hydrocarbon fuels (0004). The current collector may be stainless steel (0046).

Blanchet does not explicitly teach the catalyst elements 15 are applied as a coating to the corrugated collector. However, the invention as a whole would have been

obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have found coating the reforming catalyst obvious in view of the teaching by Blanchet of having reforming catalyst elements 15. Both references apply the reforming catalyst at identical positions in the anodic current collector and Applicant has not shown any criticality to providing the reforming catalyst as a coating versus as the catalyst elements 15 of Blanchet. Furthermore, the portions of the catalyst element 15 that touch the anodic current collector can be considered to "coat" those sections of the anodic current collector that come into contact with the catalyst element 15.

#### ***Response to Arguments***

Applicant's arguments filed 8/13/09 have been fully considered but they are not persuasive. Applicant argues Bregoli fails to teach that the fuel cell has internal reforming capability and that the fuel cell itself is capable of reforming hydrocarbon fuel. However, Bregoli teaches a fuel gas such as  $H_2$  is provided between the separator plate 32 and the anode 28 (5:9-23). Catalyst particles 34 are provided on the anode collector 30 and may be comprised of the same materials used in the anode and cathode catalysts (5:45-58). The catalyst particles 34 result in a fuel cell having internal reforming capability and a fuel cell that itself is capable of reforming hydrocarbon fuel.

Applicant argues Blanchet does not teach or suggest the catalyst should be applied selectively as a coating on the metallic substrate of the anodic interconnect. Examiner has admitted that Blanchet does not explicitly teach this limitation, but believes the limitation is obvious in view of Blanchet. The portions of the catalyst

element 15 that touch the anodic current collector can be considered to "coat" those sections of the anodic current collector that come into contact with the catalyst element 15. Examiner notes the claims do not require the catalytic coating to cover the entire surface area of the flow field. Thus, Applicant's argument that the claimed invention exposes a significantly greater surface area of the catalyst to the fuel flow than does Blanchet is not commensurate in scope with the claimed invention. The term "a catalytic coating" is given the broadest, reasonable interpretation. Examiner suggests the catalytic coating of the claimed invention be more clearly described in the claims.

Applicant argues Blanchet provides no teaching or guidance on what or how to prepare a catalyst. However, the claims are not directed toward a method of making a catalyst, but are directed toward a solid oxide fuel cell.

***Allowable Subject Matter***

Claim 12 is allowed. The following is a statement of reasons for the indication of allowable subject matter: claim 12 requires the fuel cell with the anodic interconnect having the catalytic coating to contain a solid electrolyte comprising yttria-stabilized zirconia. The prior art does not teach the anodic interconnect of the claimed invention used in a fuel cell containing the yttria-stabilized zirconia electrolyte of claim 12. The prior art teaches the internal reforming should be performed in isolation from a yttria-stabilized zirconia electrolyte (Baker 4,182,795). However, the claimed invention permits for both the internal reforming and oxidation of the hydrogen-rich reformat at the anode in the same fuel path of the same fuel cell (page 9 of remarks). Thus the

internal reforming of the claimed fuel cell is not performed in isolation from the yttria-stabilized zirconia electrolyte.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday & Tuesday (9:00-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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November 9, 2009

/TRACY DOVE/

Primary Examiner, Art Unit 1795